On page 22, line 6, following "control and data over Ethernet", please delete "32" and insert therefor - - 41 - -.

In the Drawings

Please amend Figures 9, 16c, 17, 18, 19, 20, 23, 26, 35, and 55 as shown in red in the attached drawings.

REMARKS

Applicant respectfully requests that the Examiner enter the amendments set forth above prior to examining the above-referenced application.

Applicant amends the specification and Figures 9, 16c, 17, 18, 19, 20, 23, 26, 35, and 55 to correct typographical errors. Specifically, reference numeral 32 is a duplicate. Therefore applicant replaces reference numeral 32 with reference numeral 41 in both the specification and Figures 9, 16c, 17, 18, 19, 20, 23, and 26. Applicant adds reference numeral 41 to the connection between NMS 60 and the network device 540 in Figure 35. Reference numeral 838 is added to the input marked "Alt. Input from other EX CTS" in Figure 55. Both reference numeral 41 and reference numeral 838 are referred to in the specification and used in other figures to designate the same part of the invention. No new matter is added by these amendments.

In addition, Applicant amends Figure 55 to remove an extraneous line section to indicate the correct connection of the *output* 770 to the Alt. *output* to other EX CTS. Support for this amendment can be found throughout the specification, for example, on page 129, lines 15-17. In particular, the specification at page 129 recites that "the output 770 (marked "Alt. Output to other EX CTS") of timing module 76 may be provided to the other EX CTS and received as input 838 (marked "Alt. Input from other EX CTS"). Thus, no new matter is added by this amendment.

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Group Art Unit: 2756

For the Examiner's convenience, Applicant encloses a copy of pages 21 and 22 of the specification in which the above corrections are indicated in red.

The Examiner is urged to telephone the undersigned Attorney for Applicant in the event that such communication is deemed to expedite prosecution of this matter.

Respectfully submitted,

Date: November 21, 2000

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on their boards. Slave SRMs 37a-37n then download and execute the device driver executable files (DD.exe) 56a-56n from memory 40. As one example, one port device driver 43a-43d may be started for each port 44a-44d on line card 16a. The port driver and port are linked together through the assigned port PID number.

In order to understand the significance of the PMD file (i.e., metadata), note that the MCD software does not have knowledge of board types built into it. Instead, the MCD parameterizes its operations on a particular board by looking up the card type and version number in the PMD file and acting accordingly. Consequently, the MCD software does not need to be modified, rebuilt, tested and distributed with new hardware. The changes required in the software system infrastructure to support new hardware are simpler modify logical model 280 (Fig. 3) to include: a new entry in the PMD file (or a new PMD file) and, where necessary, new device drivers and applications. Because the MCD software, which resides in the kernel, will not need to be modified, the new applications and device drivers and the new DDL files (reflecting the new PMD file) for the configuration database and NMS database are downloaded and upgraded (as described below) without re-booting the computer system.

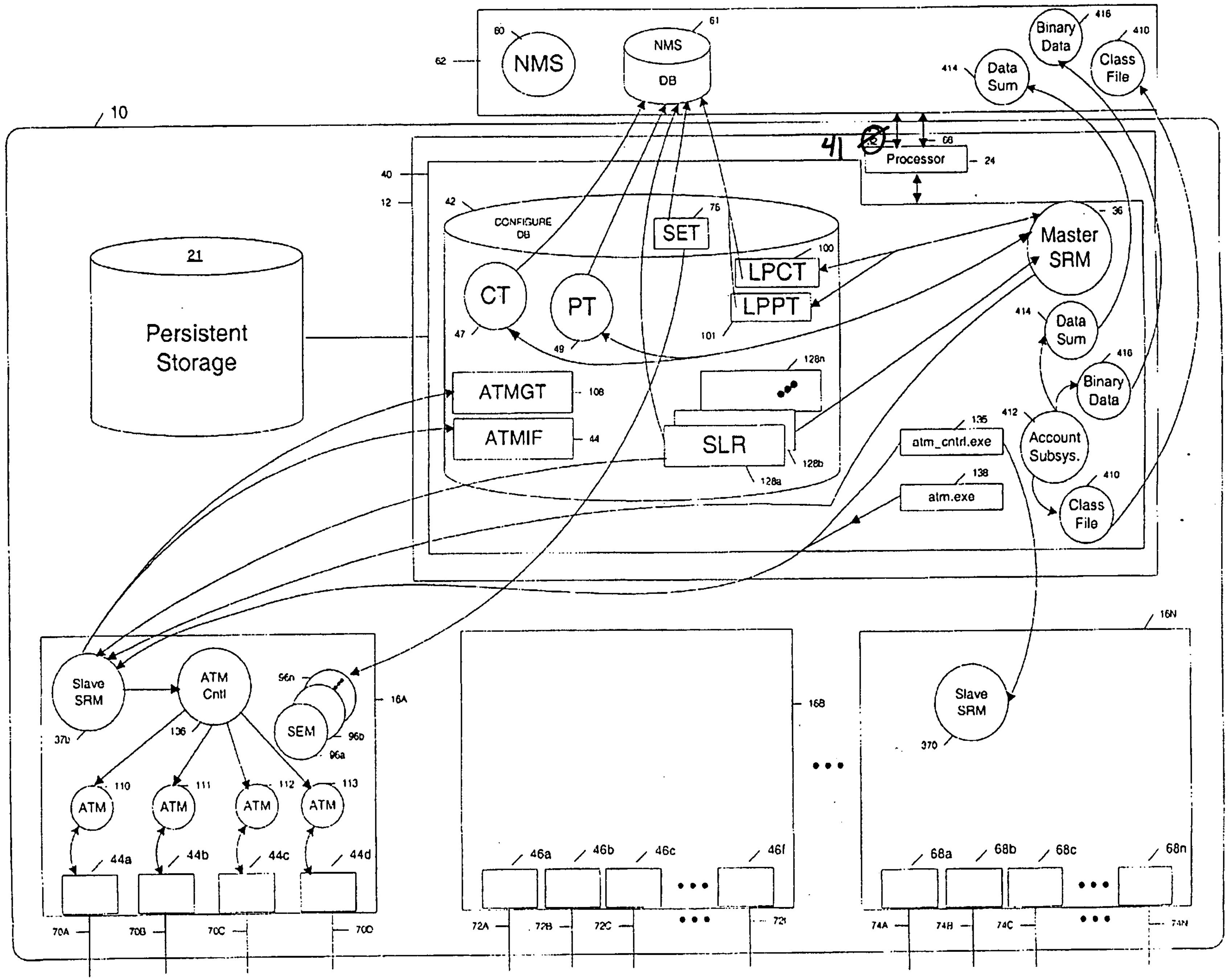
Network Management System (NMS):

Referring to Fig. 9, a user of computer system 10 works with network management system (NMS) software 60 to configure computer system 10. In the embodiment described below, NMS 60 runs on a personal computer or workstation 62 and communicates with central processor 12 over Ethernet network ~~32~~ 41 (out-of-band). Instead, the NMS may communicate with central processor 12 over data path 34 (Fig. 1, in-band). Alternatively (or in addition as a back-up communication port), a user may communicate with computer system 10 through a terminal connected to a serial line 66 connecting to the data or control path using a command line interface (CLI) protocol.. Instead, NMS 60 could run directly on computer system 10 provided computer system 10 has an input mechanism for the user.

NMS 60 establishes an NMS database 61 on work station 62 using a DDL file corresponding to the NMS database and downloaded from persistent storage 21 in computer system 10. The NMS database mirrors the configuration database through an active query feature (described below). In one embodiment, the NMS database is an Oracle database from Oracle Corporation in Boston, Massachusetts. The NMS and central processor 12 pass control and data over Ethernet 32 41 using, for example, the Java Database Connectivity (JDBC) protocol. Use of the JDBC protocol allows the NMS to communicate with the configuration database in the same manner that it communicates with its own internal storage mechanisms, including the NMS database. Changes made to the configuration database are passed to the NMS database to insure that both databases store the same data. This synchronization process is much more efficient and timely than older methods that require the NMS to periodically poll the network device to determine whether configuration changes have been made. In these systems, NMS polling is unnecessary and wasteful if the configuration has not been changed. Additionally, if a configuration change is made through some other means, for example, a command line interface, and not through the NMS, the NMS will not be updated until the next poll, and if the network device crashes prior to the NMS poll, then the configuration change will be lost. In computer system 10, however, command line interface changes made to configuration database 42 are passed immediately to the NMS database through the active query feature ensuring that the NMS is immediately aware of any configuration changes.

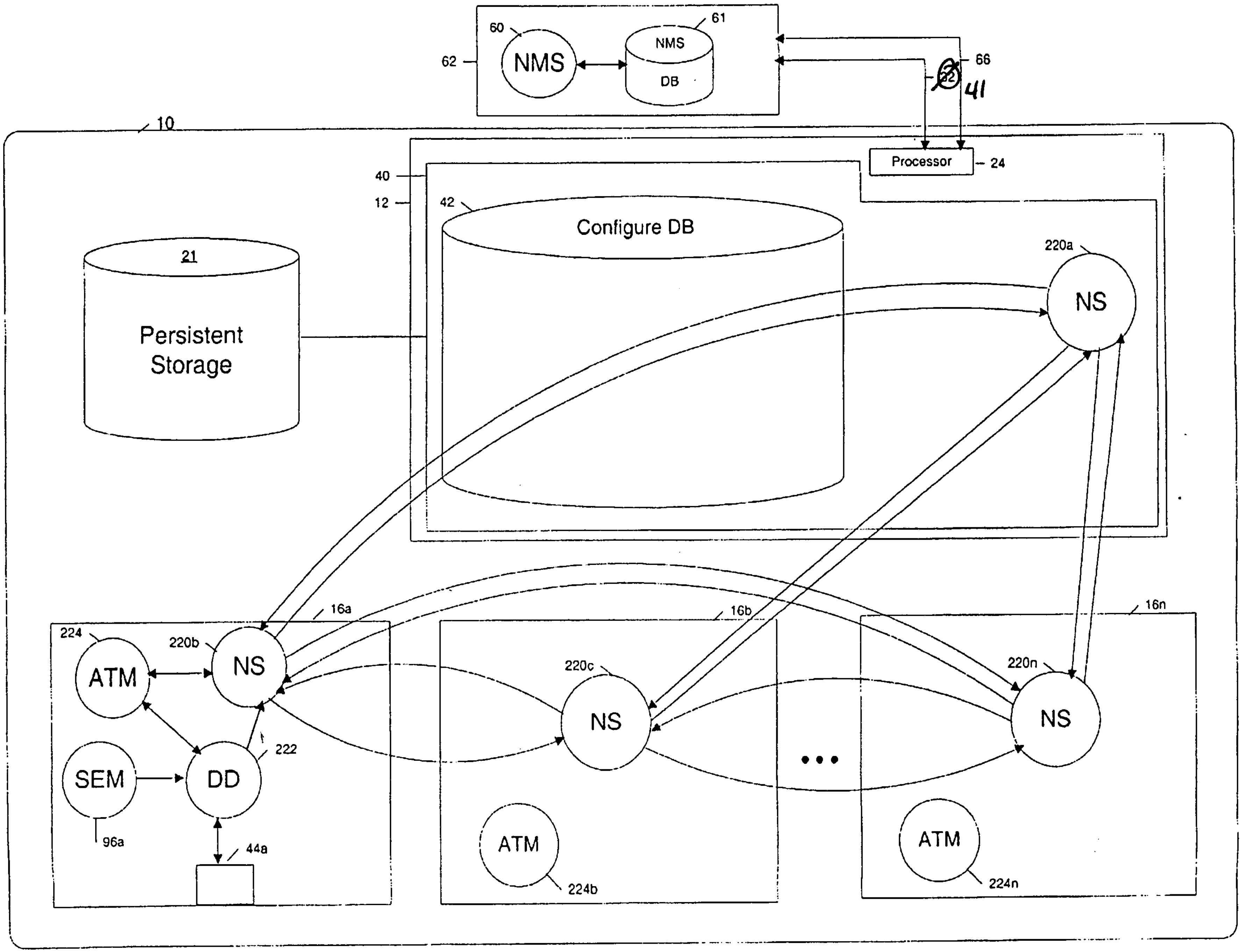
Typically, work station 62 is coupled to many network computer systems, and NMS 60 is used to configure and manage each of these systems. In addition to configuring each system, the NMS also interprets data gathered by each system relevant to each system's network accounting data, statistics, and fault logging and presents this to the user. Instead of having the NMS interpret each system's data in the same fashion, flexibility is added by having each system send the NMS a JAVA class file 410 indicating how its network data should be interpreted. Through the File Transfer Protocol (ftp), an accounting subsystem process 412 running on central processor 12 pushes a data summary file 414 and a binary data file 416 to the NMS. The data summary file indicates

FIG. 9



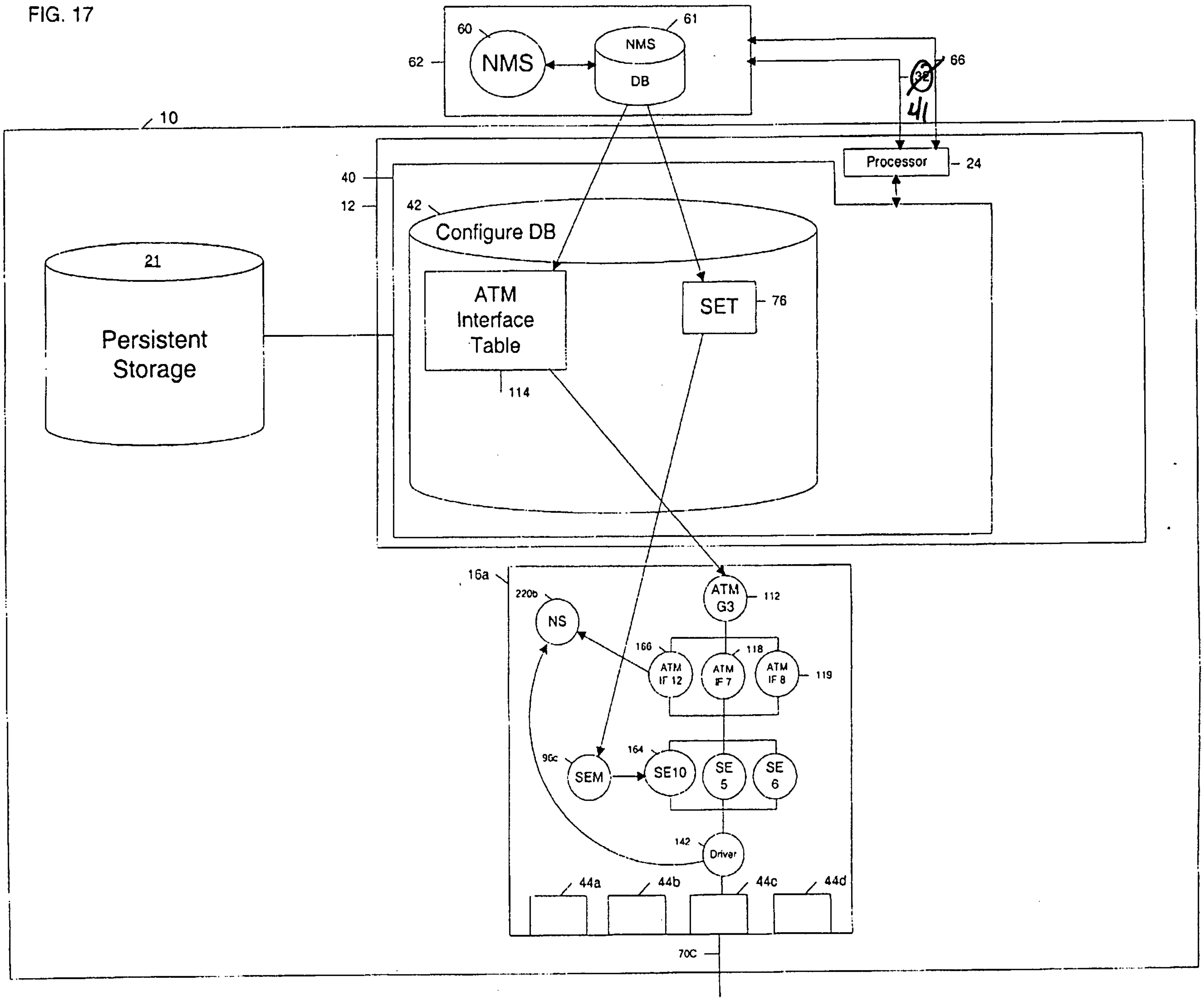
NMS
NMS DB
Data Sum
Binary Data
Class File
Processor
Persistent Storage
21
CONFIGURE DB
SET
LPCT
LPPT
CT
PT
ATMGT
ATMIF
SLR
Master SRM
Account Subsys.
atm_cntrl.exe
atm.exe
Slave SRM
ATM Cntl
SEM
ATM
10
12
16A
16B
16N
24
36
40
41
42
44
47
49
60
61
62
68
75
100
101
108
128a
128b
128n
135
136
138
110
111
112
113
370
410
412
414
416
44a
44b
44c
44d
46a
46b
46c
46f
68a
68b
68c
68n
70A
70B
70C
70D
72A
72B
72C
72f
74A
74B
74C
74N
96a
96b
96n

FIG. 16c



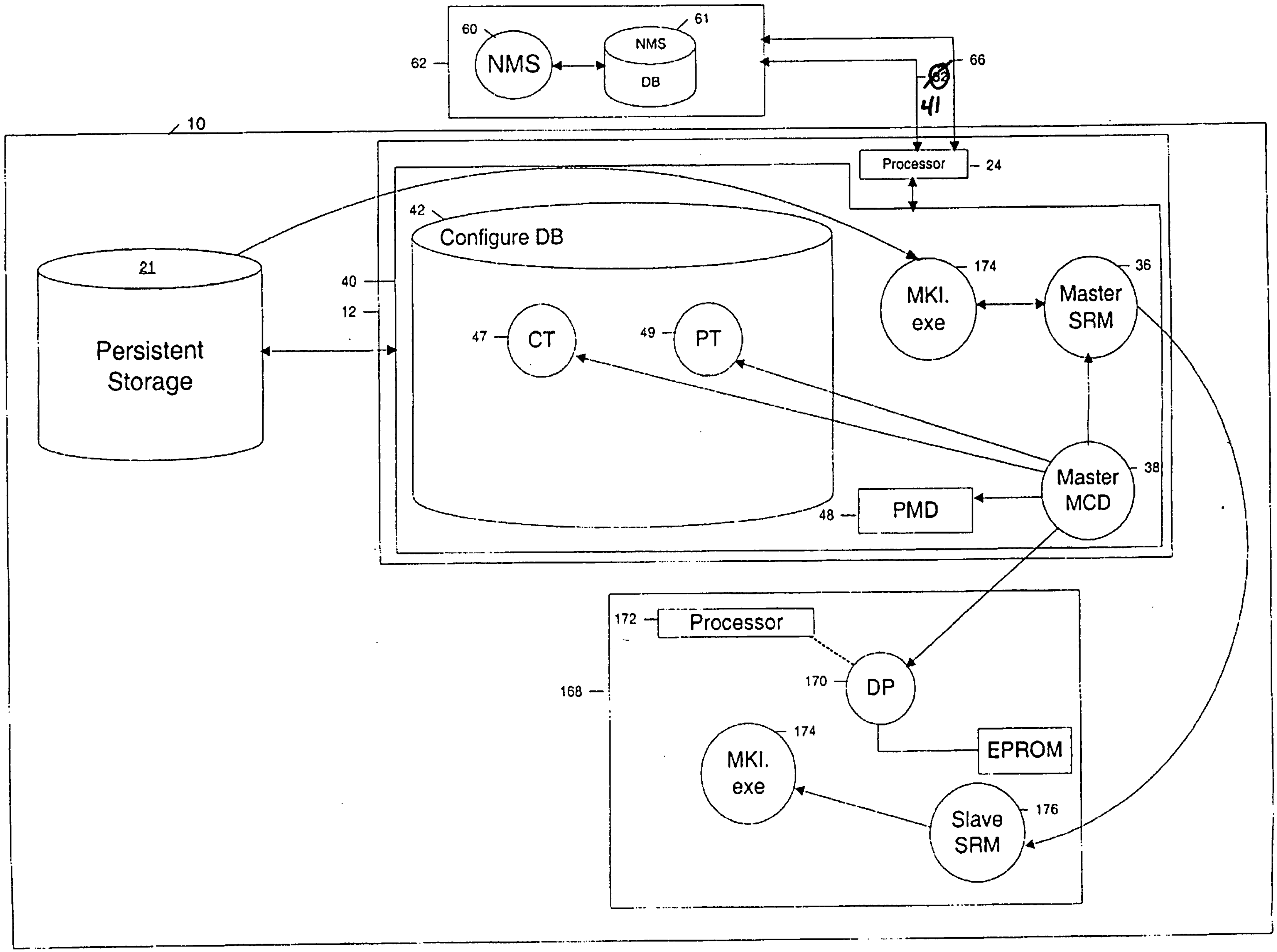
10
60
NMS
61
NMS
DB
62
66
~~22~~
41
Processor
24
40
12
42
Configure DB
21
Persistent Storage
220a
NS
16a
16b
16n
224
ATM
220b
NS
220c
NS
220n
NS
SEM
DD
222
96a
44a
ATM
224b
ATM
224n

FIG. 17



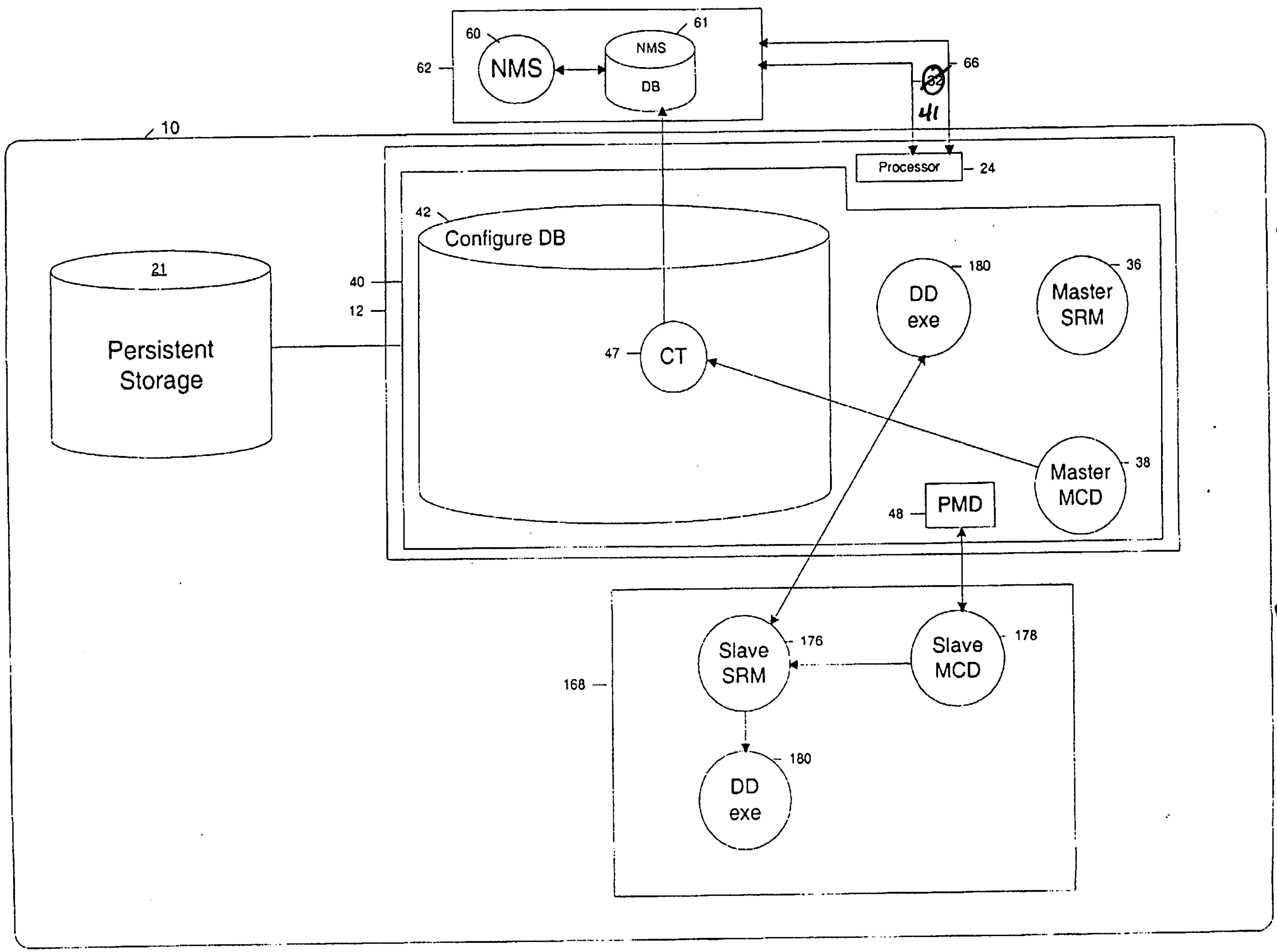
60
NMS
61
NMS
DB
62
66
~~32~~
41
10
Processor
24
40
12
42
Configure DB
21
Persistent
Storage
ATM
Interface
Table
114
SET
76
16a
220b
NS
ATM
G3
112
166
ATM
IF 12
ATM
IF 7
118
ATM
IF 8
119
96c
SEM
164
SE10
SE
5
SE
6
142
Driver
44a
44b
44c
44d
70C

FIG. 18



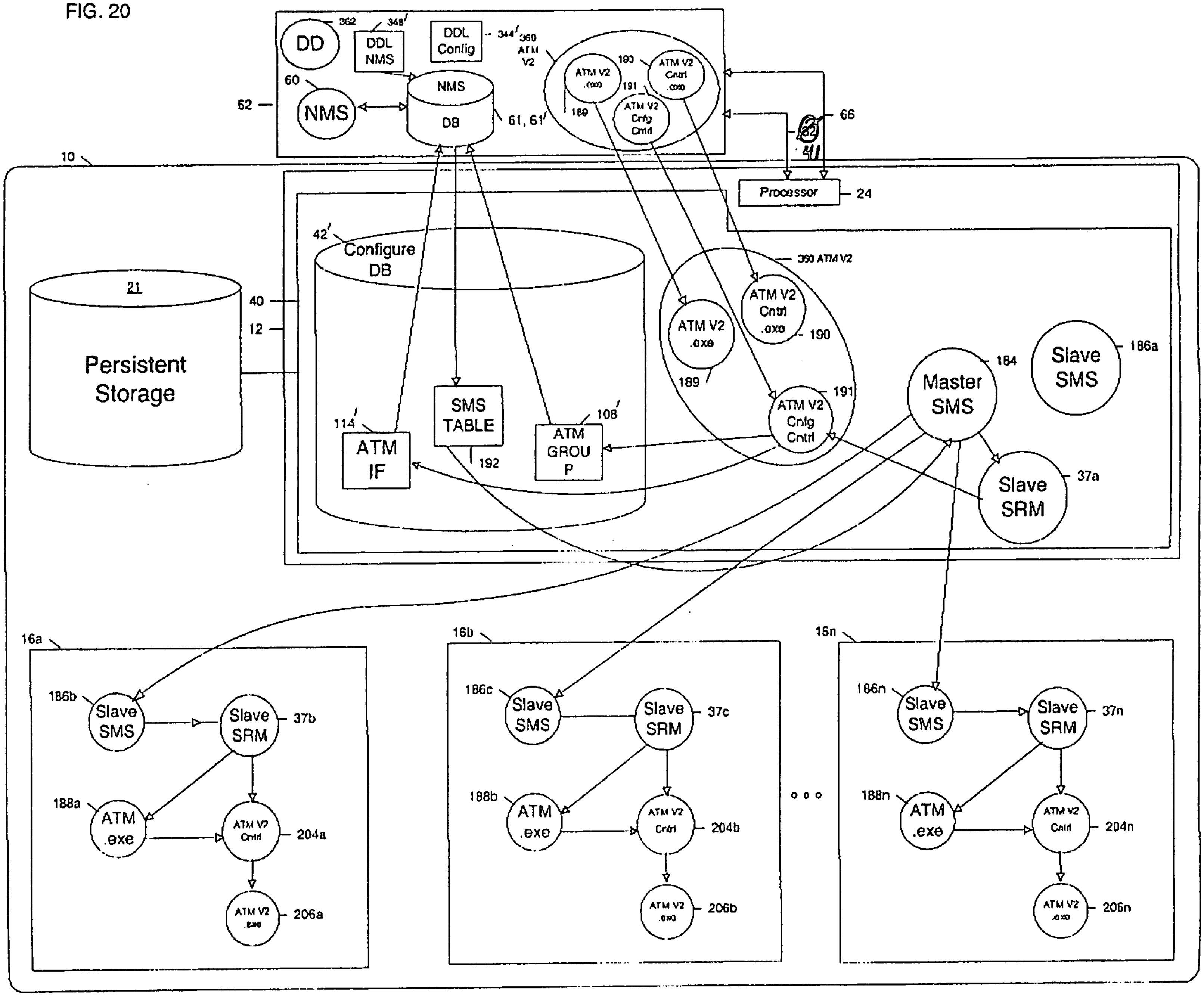
NMS
NMS
DB
60
61
62
66
41
10
Processor
24
42
Configure DB
21
Persistent
Storage
40
12
47
CT
49
PT
MKI.
exe
174
Master
SRM
36
Master
MCD
38
PMD
48
172
Processor
168
170
DP
174
MKI.
exe
EPROM
Slave
SRM
176

FIG. 19



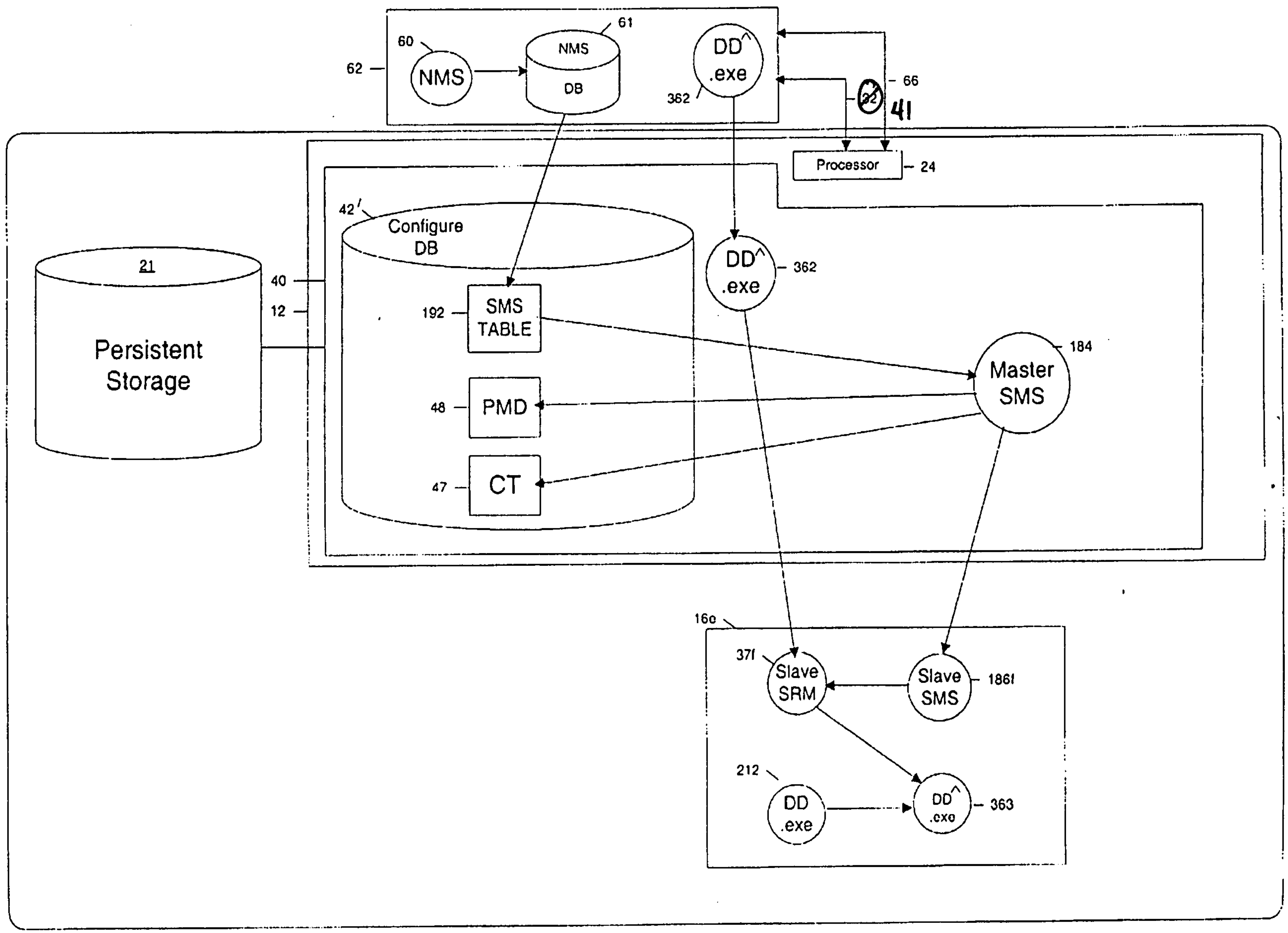
NMS
60
62
NMS
DB
61
66
32
41
10
Processor
24
42
Configure DB
21
Persistent
Storage
40
12
47
CT
DD
exe
180
Master
SRM
36
Master
MCD
38
PMD
48
Slave
SRM
176
Slave
MCD
178
168
DD
exe
180

FIG. 20



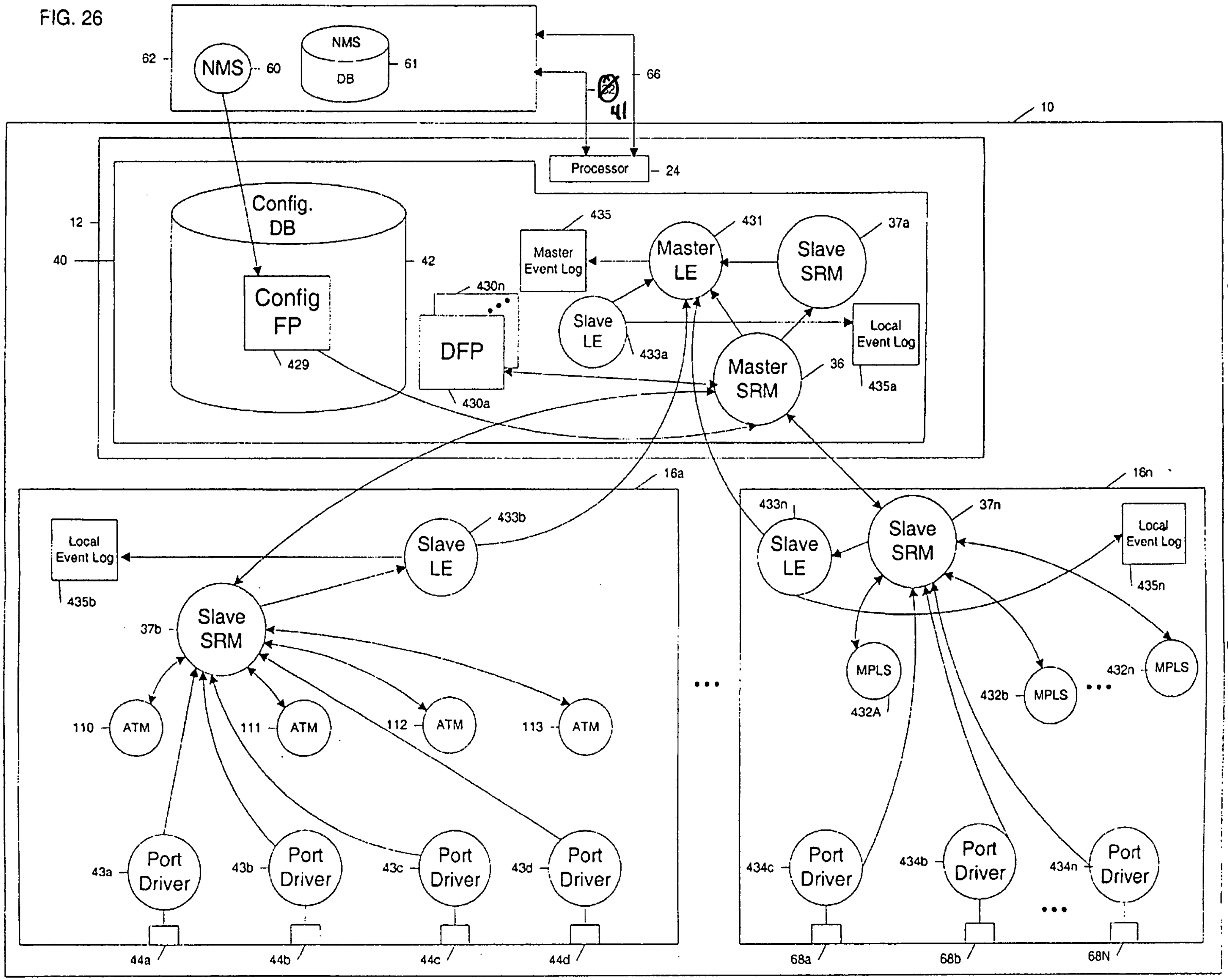
DD
362
DDL NMS
348
DDL Config
344
360 ATM V2
60
NMS
62
NMS DB
61, 61'
ATM V2 .exe
189
190
ATM V2 Cntrl .exe
191
ATM V2 Cnfg Cntrl
66
Processor
24
10
42'
Configure DB
21
Persistent Storage
40
12
360 ATM V2
ATM V2 .exe
ATM V2 Cntrl .exe
190
189
191
ATM V2 Cnfg Cntrl
114
ATM IF
SMS TABLE
192
ATM GROU P
108
Master SMS
184
Slave SMS
186a
Slave SRM
37a
16a
186b
Slave SMS
Slave SRM
37b
188a
ATM .exe
ATM V2 Cntrl
204a
ATM V2 .exe
206a
16b
186c
Slave SMS
Slave SRM
37c
188b
ATM .exe
ATM V2 Cntrl
204b
ATM V2 .exe
206b
16n
186n
Slave SMS
Slave SRM
37n
188n
ATM .exe
ATM V2 Cntrl
204n
ATM V2 .exe
206n

FIG. 23



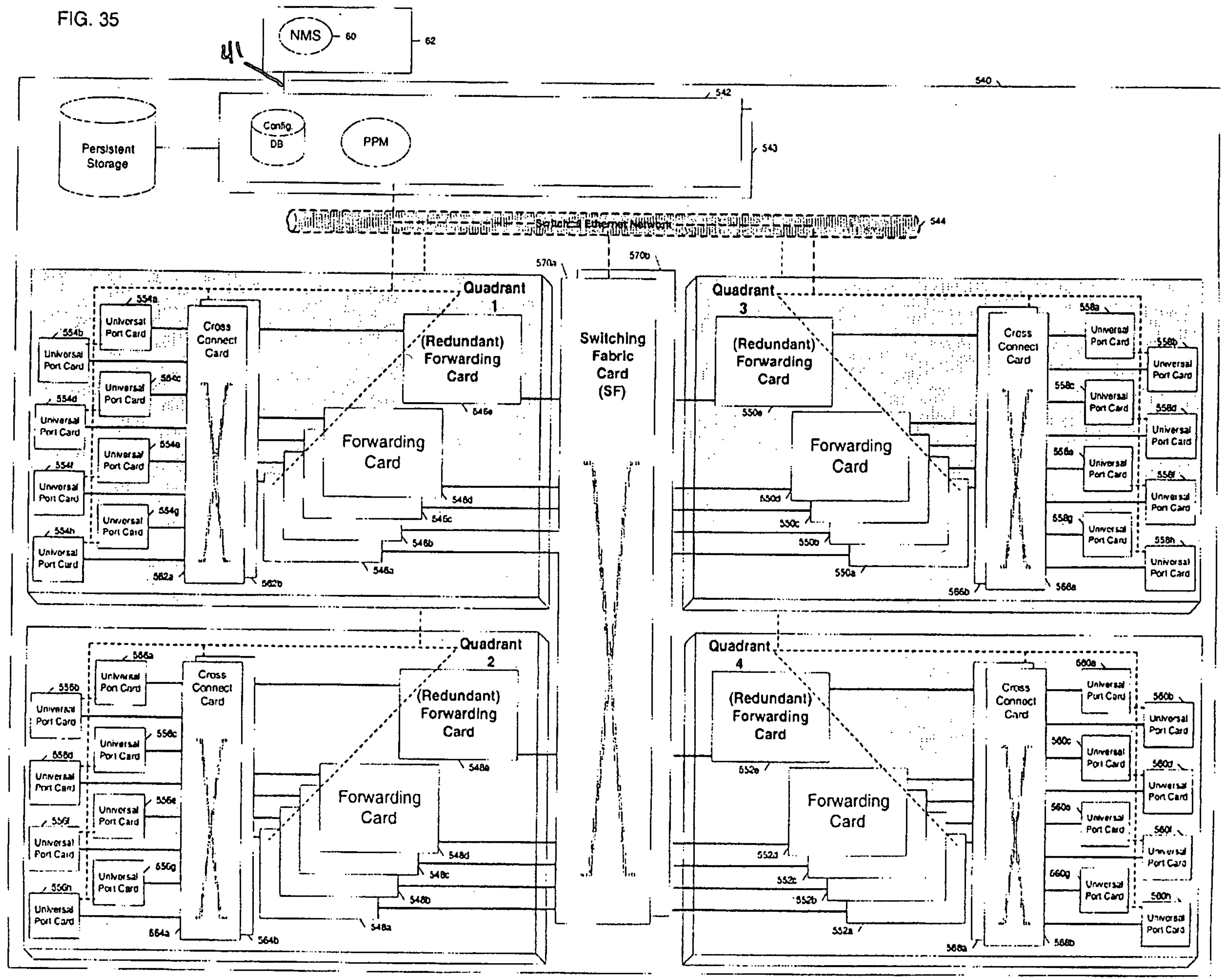
62
60
NMS
61
NMS
DB
DD^
.exe
362
66
41
Processor
24
21
Persistent
Storage
40
12
42
Configure
DB
192
SMS
TABLE
48
PMD
47
CT
DD^
.exe
362
Master
SMS
184
16a
371
Slave
SRM
Slave
SMS
1861
212
DD
.exe
DD^
.exe
363

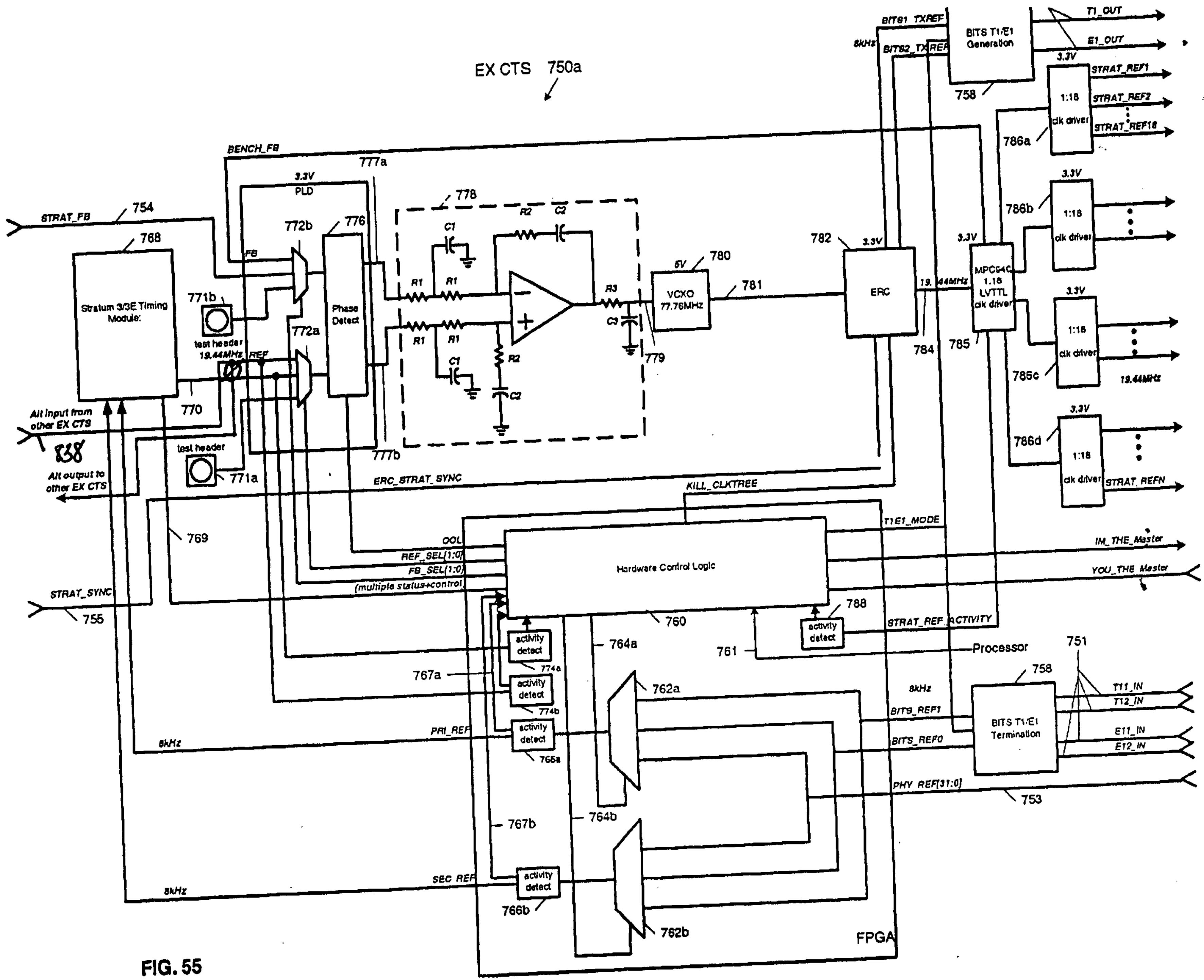
FIG. 26



NMS
60
NMS
DB
61
62
66
41
10
Processor
24
12
40
Config.
DB
42
Config
FP
429
DFP
430a
430n
Master
Event Log
435
Master
LE
431
Slave
SRM
37a
Slave
LE
433a
Local
Event Log
435a
Master
SRM
36
16a
16n
Local
Event Log
435b
Slave
LE
433b
Slave
SRM
37b
ATM
110
ATM
111
ATM
112
ATM
113
Port
Driver
43a
Port
Driver
43b
Port
Driver
43c
Port
Driver
43d
44a
44b
44c
44d
Slave
LE
433n
Slave
SRM
37n
Local
Event Log
435n
MPLS
432A
MPLS
432b
MPLS
432n
Port
Driver
434c
Port
Driver
434b
Port
Driver
434n
68a
68b
68N

FIG. 35


NMS
60
62
41
540
542
543
Persistent Storage
Config. DB
PPM
Switched Ethernet Network
544
570a
570b
Switching Fabric Card (SF)
Quadrant 1
Quadrant 2
Quadrant 3
Quadrant 4
(Redundant) Forwarding Card
Forwarding Card
Cross Connect Card
Universal Port Card
546a
546b
546c
546d
546e
548a
548b
548c
548d
548e
550a
550b
550c
550d
550e
552a
552b
552c
552d
552e
554a
554b
554c
554d
554e
554f
554g
554h
556a
556b
556c
556d
556e
556f
556g
556h
558a
558b
558c
558d
558e
558f
558g
558h
560a
560b
560c
560d
560e
560f
560g
560h
562a
562b
564a
564b
566a
566b
568a
568b



EX CTS 750a
BITS1_TXREF
BITS2_TXREF
8kHz
BITS T1/E1 Generation
758
T1_OUT
E1_OUT
3.3V
STRAT_REF1
STRAT_REF2
STRAT_REF18
1:18
clk driver
786a
786b
786c
786d
19.44MHz
STRAT_REFN
BENCH_FB
777a
777b
PLD
778
STRAT_FB
754
768
Stratum 3/3E Timing Module:
772b
772a
776
Phase Detect
FB
REF
771b
771a
test header
19.44MHz
770
Alt input from other EX CTS
838
Alt output to other EX CTS
R1
R2
R3
C1
C2
C3
779
5V
780
VCXO 77.76MHz
781
782
ERC
784
785
MPC940 1:18 LVTTL clk driver
ERC_STRAT_SYNC
KILL_CLKTREE
769
OOL
REF_SEL[1:0]
FB_SEL[1:0]
(multiple status+control)
T1E1_MODE
IM_THE_Master
YOU_THE_Master
Hardware Control Logic
760
788
activity detect
STRAT_REF_ACTIVITY
761
Processor
751
STRAT_SYNC
755
764a
764b
774a
774b
765a
766b
767a
767b
762a
762b
PRI_REF
SEC REF
BITS_REF1
BITS_REF0
BITS T1/E1 Termination
T11_IN
T12_IN
E11_IN
E12_IN
PHY REF[31:0]
753
FPGA

FIG. 55